

**Atlantic Large Whale Take Reduction Team Meeting
April 25-27, 2017: Providence, RI**

KEY OUTCOMES

I. OVERVIEW

NOAA's National Marine Fisheries Service (NMFS) convened the Atlantic Large Whale Take Reduction Team (Team) April 25-27, 2017, in Providence, RI. The purpose of the meeting focused on the following specific objectives:

- Provide the TRT with the latest information regarding right whale and humpback whale abundance
- Provide the TRT with detailed information surrounding entanglement and mortality events documented since 2014
- Discuss recent research on gear modifications
- Review and provide a recommendation related to the exemption request from South Shore Lobster Fishermen's Association, including the associated conservation equivalence
- Discuss implications of recent findings and the need for future action

II. PARTICIPANTS

The three-day meeting was attended by 41 members of the 59-person team. Participating Team members (or their alternates) were: Regina Asmutis-Silva, David Borden, Peter Brodeur, Beth Casoni, Dwight Carver, Jane Davenport, Greg DiDomenico, Cindy Driscoll, Clay George, Colleen Giannini, Robert Glenn, Caroline Good, Sonny Gwin, John Haviland, Chris Hickman, Bob Kenney, Raymond King, Scott Kraus, David Laist/Dee Allen, Kristy Long, Charles "Stormy" Mayo, Patrice McCarron, Bill McLellan, Bob Nudd, Scott Olszewski, Cheri Patterson, Charlie Phillips, Tom Pitchford, Meghan Rickard, Jooke Robbins, Arthur Sawyer, Brian Sharp, Erin Summers, Todd Sutton, Kate Swails, Mark Swingle, Sarah Uhlemann, Mason Weinrich, David Wiley, Sharon Young and Barb Zoodsma.

In addition to the NMFS representatives on the Team (Swails, Long and Zoodsma), the Greater Atlantic Regional Office (GARFO) was represented at the table by Dave Gouveia and Kim Damon-Randall; GARFO Regional Administrator John Bullard presented opening remarks. Other NOAA staff attending the meeting included: Diane Borggaard, Mike Asaro, David Morin, Glenn Salvador and John Higgins with GARFO; David Hilton with the Southeast Regional Office; Sean Hayes, Allison Henry, Richard Pace and Peter Corkeron with the Northeast Fisheries Science Center; and John Almeida with NOAA's Office of General Counsel. Katie Moore with the U.S. Coast Guard also attended the meeting, as did a seven-person contingent from Fisheries and Oceans Canada (DFO). Scott McCreary with CONCUR and Bennett Brooks from the Consensus Building Institute served as the neutral facilitators. Approximately 60 members of the public, state agencies and affiliated organizations were in attendance over the course of the meeting.

III. MEETING MATERIALS

Meeting materials were provided in advance to support the group's deliberations. Copies of meeting materials can be found on-line at:

<http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/2015meeting.html>

Documents can also be obtained by contacting K. Swails at 978-282-8481 or via email at kate.swails@noaa.gov

IV. DISCUSSION SUMMARY

Below is a brief summary of the main topics and issues discussed during the meeting. This summary is not intended to be a meeting transcript. Rather, it provides an overview of the main topics covered, the primary points and options raised during Team discussions, and areas of emerging or full consensus.

A. Welcome and Introduction

The meeting began with welcoming remarks by GARFO Regional Administrator John Bullard. His remarks focused on the following main points:

- Thanking members for their participation in and ongoing commitment to the Take Reduction Team process. He called out, in particular, the many efforts/sacrifices undertaken by industry to support Take Reduction Plan goals.
- Underscoring the challenges associated with the recent downward trend in the right whale population, a shift he attributed to a wide range of causes (from habitat loss and acoustics to genetics, changes in prey abundance and entanglement and mortality with commercial fishing gear).

Challenging Team members to consider the ramifications of the latest population and entanglement and mortality data and help the agency assess whether additional measures are needed to meet Marine Mammal Protection Act goals, and if so, identify what actions should be taken. Following the Regional Administrator's remarks (and Team member self-introductions), GARFO leadership and the facilitation team reiterated the primary meeting objectives noted earlier in this summary, introduced new Team members, provided an overview of the meeting agenda and reviewed the meeting protocols.

B. Background Briefings

The initial part of the meeting focused on providing updates to Team members on a range of topics important to assessing progress towards meeting MMPA goals and informing discussions regarding possible new measures. Below is a summary of key presentation points, and all presentation materials are available at:

<http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/2015meeting.html>

Team member concerns and comments related to the presentations are captured in the discussion section below.

RIGHT WHALE ABUNDANCE

- ***Right whale abundance.*** Richard Pace with the Northeast Fisheries Science Center (NEFSC) provided an update on recent right whale abundance data. His presentation centered on the following key points: (1) recent shifts in right whale movements – both movement pattern and speed – makes it increasingly biased (low) to estimate abundance by longstanding census methods; (2) the Center is developing a new methodology to account for a higher proportion of “missed” sightings by using a statistical framework that makes the key assumption that right whales are using areas they have traditionally used in the past but not staying in those areas as long; the model accounts for this drop in sightings; (3) estimates derived from this new methodology provide strong evidence a decline in overall abundance (from a recent high of 481 animals down to 460 in 2015), with the drop steepest among female right whales; (4) calving rates are down, with just 5 calves detected thus far in 2017; moreover, NEFSC analysis reveals that the lower calving rate is insufficient to replace population-wide mortality; and (5) recent modeling efforts based on mark-recapture studies of seriously injured whales suggests mortality may be higher than the observed number (the estimated entanglement is greater than 10 per year, while the observed figure is presented as 4.2; both numbers exceed PBR). More broadly, Pace’s presentation highlighted the challenges of inferring trends from small data sets and the inherent unpredictability of the simple census method.
- ***Right whale literature review.*** Peter Corkeron with NEFSC provided a summary of recent research efforts (by the Center and others) into right whale abundance. Key presentation points included the following: (1) measures to reduce vessel strikes appear to be working in lowering ship strike-caused mortality in North Atlantic right whales, though seasonal management areas could be larger and longer; (2) studies of entanglements, rope size and injuries suggest injury severity to right whales is worse with stronger rope, survival probability is reduced approximately 20% by entanglement, and condition at the end of entanglement is a good predictor of survival; and (3) the sublethal effects of drag from an entanglement can impact right whale fecundity. Corkeron suggested that while food distribution is a major factor in whale distribution, it does not appear to be a major driver for right whale population trends. He also noted that the copepod *Calanus finmarchicus*, a key foraging source for right whales, does not appear to be significantly impacted by warming waters, as this organism moves into the area via currents rather than seeking water temperature. He suggested that key concerns center around chronically high adult mortality and a chronically poor and variable calving rate and contrasted, in particular with, the significantly higher right whale calf production over time in South Africa, Australia and Argentina versus the North Atlantic Right Whale.
- ***Marine Mammal Commission report.*** Dee Allen with the Marine Mammal Commission

reviewed the Commission's April 2017 letter to the National Marine Fisheries Service. The letter, drafted following the MMC's annual meeting, underscored the apparent increase in entanglements and subsequent impact on right whale health. The MMC called for urgent action to address what the Commission sees as the greatest anthropogenic threat to right whales in the North Atlantic. The Commission letter calls for increased research, expanded engagement with Canada, and management measures (e.g., phasing in of low breaking-strength line, enhanced gear markings) to reduce the lethal and sublethal effects of entanglement in the U.S. and Canada.

HUMPBACK WHALE ABUNDANCE

- ***Humpback whale abundance.*** R. Pace presented data on humpback whale abundance, noting the difficulty in estimating humpback whale abundance from single line transect surveys due to their "clumped" distributions. Accordingly, Pace noted the Center's preference to use mark-recapture analysis. Pace highlighted the volatility in estimates between the draft 2016 (available online; not yet finalized) and draft 2017 stock assessment reports (not yet available online; numbers subject to change), showing the sharp change in minimum abundance estimates (from 823 to 239 animals) and potential biological removal (from 13 to 3.9 animals) given the shift from a mark-recapture methodology (2016) to line transect (2017). Because of the drastically different data sets and methodological approaches, these two very different abundance measures neither support nor refute a decline in the Gulf of Maine humpback stock. Pace is working with the Center and Jooke Robbins to develop two alternative methodologies for addressing the volatility.

ENTANGLEMENT DATA

- ***Right Whale and Humpback Mortalities and Serious Injuries.*** Allison Henry with NEFSC first provided an overview of the process and timeline used to track and assess mortalities and serious injuries, noting that the analysis draws on data from NOAA regional offices and Canadian stranding and entanglement networks. She explained that this data is then vetted through the Atlantic Scientific Review Group (SRG) and an NEFSC review. She then provided key results from the most recent data (2011-2015) for all large whale stocks, including: (1) roughly three-quarters of the reported human interaction events (including both vessel strikes and entanglement) are first detected in U.S. waters; and (2) of the 295 mortalities for all large whale stocks detected, 12% are traced to entanglements, 10% to vessel strike, 9% to natural causes and remaining 69% have unknown causes. Looking at 2015 mortalities and serious injuries (to be published in the 2017 SAR), both right whale and humpback are above PBR (3.5 for right whale versus PBR of 1.4; 8.5 for humpback versus PBR of 3.9. (The 2015 mortality and serious injury figures are still draft and subject to change.) However, it was noted that the mortality and serious injury data used to evaluate where the stocks are with respect to PBR included combined totals from both the U.S. and Canada. Of the right whale mortalities and serious injuries, the Center was unable to determine whether they occurred in U.S.

or Canadian waters because the gear was unidentifiable.

- ***Entanglements and Gear-Marking.*** Dave Morin presented his analysis of entanglement events from the perspective of gear marking. Key findings included: (1) in 2015, 4 of 36 new confirmed entanglement cases involved right whales; in 2016, the comparable figures was 7 of 50 cases; (2) increased gear marking has allowed NMFS to identify gear to country of origin more frequently (roughly 25% of all large whale entanglements were tied to U.S gear in 2015 and 40% in 2016); more than half of the new confirmed entanglements could not be identified by country of origin; (3) of the U.S.-identified gear, slightly more than half of the entanglements were sourced to lobster gear; and (4) out of the 11 new right whale entanglement cases reported, 4 were identified to a fishery - 1 in U.S. lobster and 3 in Canadian snow crab. Morin reviewed the location of the various observed takes, and he noted the difficulties in tracing gear to specific commercial fisheries given the small sample size of cases and recovered gear with limited or no markings.

RECENT RESEARCH

- ***Rope type and right whale injuries.*** Amy Knowlton presented results of her recent work with Tim Werner and Scott Kraus to better understand the metabolic and reproductive consequences of entanglement to right whales and on possible measures to reduce entanglement risk. She presented a model framework that examined survival by injury category and the implications of entanglement for the health and robustness of right whales. Her studies indicate that injury severity increases with rope strength and that female whales are disproportionately impacted, which has implications for whale reproduction and population trends. (Assessment of data through 2009 shows that 83% of the population has experienced one or more entanglements, and the proportion of moderate-severe injuries has increased since the late 1990s; recent data suggests this trend is continuing). She also presented information on experiments with “whale-release rope” with a breaking strength of about 1,700 pounds, which can be achieved by interspersing flexible sleeves, or partially cutting rope and taping the strands. Additional study is planned to better evaluate gear loss, degradation and handling concerns associated with use of the weaker rope. Knowlton recommended the Team start to consider a “paradigm” shift (e.g., moving towards ropeless fishing) to make gear safe for whales in U.S. and Canadian waters.
- ***Ropeless fishing.*** T. Werner presented a summary of recent efforts to develop the technique of lineless fishing as a viable option to reduce entanglement risk to large whales. He first reviewed past research efforts and emerging technologies (burn wires, acoustic releases, etc.). Werner then noted that the technique has been tested in limited but still realistic circumstances in Australia, but there are no tests yet in New England. (The fishery context of the lineless fishing in Australia is a substantially reduced number of participants, as strong entry rules have sharply reduced the number of participants and also been commensurate with a significant

increase in the price of landed lobster.) Werner acknowledged the many significant concerns associated with lineless gear (cost, technology, deck space, monitoring and enforcement, cross-gear conflicts, safety concerns, etc.), but he encouraged Team members to not prematurely write-off the potential for technological advances to improve the viability of lineless fishing gear over time.

C. Take Reduction Plan Ramifications

The presentations triggered extensive Team discussions, both in plenary and caucuses. Much of the time was spent by Team members trying to better understand the information presented and then grasping to craft a coherent narrative regarding the implications for the Large Whale plan. The dialogue underscored the Team's longstanding efforts to develop a strong and broadly supported approach for reducing right whale entanglements. Below is a summary of key discussion points.

- ***Varied conclusions from latest abundance/entanglement data.*** Presentations on the latest data drew mixed reactions from Team members. Some participants suggested the latest data (e.g., falling abundance trends, low calving rates, sub-lethal impacts on reproduction, interactions exceeding PBR) clearly demonstrate the ongoing risk to North Atlantic right whales. Moreover, they suggested that the most recent humpback entanglement data demonstrated a clear and ongoing connection to U.S. commercial fisheries (and lobster fisheries in particular). Entanglement data for right whales was not as clear. Other Team members, however, suggested the newly presented abundance data presented was preliminary, difficult to understand and warranted more extensive vetting, and they questioned some of the assumptions underpinning the model presented by R. Pace. (Additional discussion on information vetting needs is provided below.) They also noted the range of other factors impacting right whale abundance, from vessel strike and Canadian fishery interactions, to climate change impacts and shifting distribution of food sources, and urged a broader look at causes and solutions, pushing back at what they considered the undue focus on commercial fisheries.
- ***Focus on calving rate impacts.*** Team deliberations sought to better understand the drivers for and implication of what appear to be falling calving rates. One Team member questioned whether the resurgent great white shark population might be responsible for fewer calf sightings, and another sought to understand the correlation, if any, between water temperatures, prey availability/quality and calving rates. It was also noted that the calving rate has dropped in previous years and yet the population has still increased. Other Team members suggested that the data indicating a drop in calving rates is solid and warrants concern. For one thing, they said, past drops in calving rates have been limited to three-year cycles; the current drop has extended over five years. They also cited the analyses suggesting the apparent negative impact of entanglements on female fecundity, and several Team members flagged the dramatic difference in right whale calf production between North Atlantic Right Whale and those in South Africa, Australia and Argentina as particularly troubling.

- ***Current gear marking scheme problematic.*** A wide range of Team members suggested that the current gear-marking approach is still not sufficient. They noted that given the large number of interactions that could not be assigned to either a specific gear type or country due to the lack of effective gear markings (marking intervals on the line not spaced tightly enough, difficult to identify from a distance, etc.) Some Team members also questioned the rate of compliance with existing gear-marking requirements. Several suggestions were offered to strengthen gear marking efforts, including increasing marking frequency on line, adding markings to sinking ground line and buoys. Other suggestions included: making the entanglement database available to the team; taking action to engage on Canadian gear marking efforts; involving industry in gear identification; and considering the value of establishing an independent panel to review entanglement events. No consensus was reached on specific measures, though there were suggestions to convene a small working group to take a more comprehensive look at gear-marking needs.
- ***Mixed imperative for new management measures.*** Team members offered mixed perspectives on the imperative for new measures. Some Team members suggested that the current efforts – vertical line reductions, sinking groundline – are insufficient to meet MMPA goals and reverse the troubling abundance and calving trends; a new paradigm is needed to devise management strategies, they said, to address gear-marking deficiencies and identify new targeted mitigation measures (e.g., weak lines, ropeless gear, capping fishing effort). Other Team members, however, suggested that additional review of and greater confidence in the underlying data is needed before pivoting to any new management approaches. For one thing, these participants said, it is important to confirm that the trends identified in the recent analyses are accurate. Moreover, industry representatives around the table said they need greater certainty in the data if they are to make the case to fishermen to consider new measures, particularly with respect to entanglements occurring in the U.S. or Canada. A number of industry members were concerned that only the U.S. fishing industry has been the focus of regulations when entanglements occur in both U.S. and Canadian waters. Specific suggestions included: (1) convene an independent review panel to review the most recent science; (2) investigate existing legal and procedural authorities that allow ropeless fishing; (3) consider using management strategy evaluation (MSE) techniques to better understand population recovery projections under different scenarios; (4) convene a cross-interest subset of Team members to begin brainstorming possible approaches moving forward; and (5) work with Canada to develop gear marking schemes to help determine where entanglements are originating
- ***Limited toolbox to address interactions.*** Team members broadly acknowledged the lack of widely acceptable and immediately viable mitigation measures to reduce commercial fisheries interactions with whales. Team members also widely agreed that a one-size-fits-all solution is unlikely to work across the geographic range of the

right and humpback whales and the fishery conditions covered by the TRP. That said, participants had varied perspectives on the longer-term potential of mitigation options such as lineless fishing and weaker rope. To some, the imperative for new strategies coupled with the potential for future technological advances suggests the need for an aggressive and immediate effort to push at developing and testing possible gear fixes. Discussions need to start now, these Team members said, if viable options are to be developed in the coming years. Industry and some state partners were not ready to support this path, suggesting that options such as lineless fishing, weaker rope and grappling for gear are highly problematic alternatives due to operational concerns (potential for personal injury, lost gear, gear conflicts, changes in rope strength with use) and distinct geographical constraints (e.g., areas with rocky bottom and strong tides). They suggested that as a first step, better baseline data was needed on, for example, types of line currently used before new measures could be meaningfully considered. There was possible interest among Team members in establishing a work group to explore possible next steps, but no concrete options were put forward for potential work team deliberation and refinement. However, industry and state members were committed to continuing research to address interactions with some future studies (e.g., Maine DMR) being planned.

- ***Impacts of Canadian fisheries.*** Team members broadly endorsed the need to work more aggressively with Canada to foster action on a range of measures intended to reduce bycatch and better understand right whale interactions. Efforts in Canada are more important than ever, participants said, as right whale distribution appears to be shifting northward. A number of participants underscored the importance of coordinating with Canada on both gear-marking schemes to minimize the likelihood of unidentified gear being found on entangled animals and bycatch reduction measures. Cathy Merriman with DFO provided an overview of recent and planned actions to address right whale issues in Canadian waters, which includes but is not limited to the following actions: (1) voluntary measures to reduce right whale entanglements (e.g., active reporting and avoidance of right whales in the Bay of Fundy lobster fishery); (2) increasing the number of visual and acoustic surveys, as well as research into prey (*Calanus*) availability; (3) implementation of both the Oceans Protection Plan and Species At-Risk Act; and (4) analysis of right whale/fisheries overlap. Merriman underscored Canada's commitment to continue its collaboration with NMFS. Both Merriman and GARFO staff underscored their commitment to continue and deepen collaboration in information sharing and bycatch avoidance efforts.
- ***Data-vetting process.*** As noted earlier, some Team member concerns with the latest data triggered extensive discussions regarding the merits of an expanded process to vet and confirm key analyses. Several industry members suggested the Science Review Group (SRG) process is insufficiently rigorous, independent and transparent for a key species such as right whales. Rather, they said, the Agency should consider supporting a one-time benchmark assessment for right whales. This

would be an independent review process perhaps with some elements similar to the Fishery Management Council's approach to vetting stock assessments (non-aligned scientists, multi-day meeting focused on a single stock, etc.), particularly given the new models being used and the importance of the North Atlantic right whale.

Conservationist and researcher Team members agreed on the importance of rigorous review and expressed a willingness to explore different models, but they pushed back at the critique of existing efforts, noting that SARs are in fact vigorously peer reviewed, reaffirming SRG members' commitment to rigorous science, and flagging other recent efforts to discuss the emerging right whale data (e.g., MMC's annual meeting in April, Right Whale Consortium meeting in late 2016).

Recommendations for building greater credibility in the data ranged from engaging the Center for Independent Experts under NMFS Office of Science and Technology (a review that NMFS staff noted comes with a steep price tag) to working jointly to scope a benchmark assessment (focus, participants, linkage to decision-making, etc.).

More broadly, individual Team members suggested a number of strategies for strengthening the effectiveness of Team meetings, with most of the ideas centered on technical presentations. Specific suggestions included the following: (1) working more closely with Team members prior to meetings to ensure the Agency is developing the analyses necessary to support effective Team deliberations (e.g., breaking out right whale from other large whale data, additional information on gear); (2) providing data well in advance of the meeting (e.g., webinars in advance of meeting, ½-day meeting before TRT begins to provide information so everyone starts on same page); and (3) ensuring presentations are clear and readily understandable (e.g., using terminology that is accessible to the range TRT members; providing crisp summaries highlighting key takeaway points, etc.). There were also suggestions for the Team to meet more frequently (either in-person or via webinar). Additional information on the status of ship strike mitigation and addressing other threats was requested. Continued collaboration was a theme that many members noted was important to move the issue forward.

Team deliberations generated a range of other topics, including:

- A suggestion that NMFS put more effort into establishing protocols to investigate the breaking strength of recovered gear, particularly given industry concerns that 1,700-pound breaking strength diminishes with use.
- As part of this effort, the Agency should consider the relative merits/limitations of weak-line requirements focused on breaking strength versus line diameter.
- Interest among a broad range of Team members to understand the potential for aquaculture projects and new fisheries to increase entanglements with the right whale population.
- Recommendations to model the likely impact on future right whale populations given various levels of mortalities and serious injuries relative to PBR (potential biological removal).
- Interest in better understanding possible shifts in *Calanus* abundance and location

- and the possible associated impacts to right whale abundance, fecundity, etc.
- Recommendations from industry participants for the Agency to identify existing TRP measures deemed ineffective and share them with the Team for possible removal.
- Recommendations from the industry/state caucus that NMFS create more opportunities for competitive RFPs (request for proposals) when funding allows.
- Concerns that the existing trawling up measures may be problematic, as the heavier trawls may increase the severity of injuries.
- Suggestions from some industry members that ship strike may be a more significant driver for falling abundance levels. Science members also commented on the ship strike problem and the occurrence of continued mortality since the regulations (e.g., need considerations for all vessel lengths).

The Team was unable to develop consensus recommendations based on the discussion. Rather, the two main caucuses (industry/state reps and conservationist/researchers) each put together separate lists of recommended actions for the Agency to consider. (Note: Not all Team members participated in the caucuses. Also, some state reps joined with the conservationist/research caucus.)

The industry/state caucus list (provided as Attachment xx) centered on the following:

- Strengthening engagement of Canada in the ALWTRT including measures, moving toward parity in whale protection, integrating survey design, participation in Large Whale Stock Assessments and gear marking.
- Increasing funding for competitive RFPs.
- Improving peer review of key right whale data with an emphasis on creating an arms' length relationship between publishers of articles and peer reviewers.
- Conducting population and risk assessments to assess the likelihood of management success under several different scenarios and to account for climate change and broad-scale ecosystem change.
- Conducting a comprehensive assessment/summary of all gear characteristics (line diameter, line type, etc.) involved in entanglements; include industry in reviewing final determinations. Also assess current gear-marking strategies.
- As part of an assessment of the operational feasibility of 1,700 pound breaking strength fishing line, assessing the current line strength of new and used vertical line in the existing fisheries.

The conservationist/researcher list (provided as Attachment xx) focused on three broad areas:

- Strengthening the TRT process, including recommendations focused on TRT meeting frequency and structure; entanglement and mortality and recovered gear reports; and Agency reports related to ropeless fishing and aquaculture/other emerging fisheries.
- Improving current gear marking, with the goal of better understanding the times,

locations and fisheries involved in entanglement incidents in the U.S. and Canada.

- Exploring gear alternatives such as ropeless fishing and/or 1,700 pound breaking strength lines to reduce or avoid entanglements

Representatives from each caucus agreed to meet separately in the weeks following the TRT meeting to review their respective lists and work to identify and submit shared priorities for consideration by the Agency.

D. South Shore Lobster Fishermen's Association Exemption Request

The Team spent a significant portion of Day Two discussing the exemption request put forward by the South Shore Lobster Fishermen's Association to allow fishing in specific areas currently closed around Cape Cod during the February-April time period. The proposal, presented by Team member John Haviland, comprised the following:

- Interested trap/pot fishermen willing to use modified gear (see description below) would be exempt from the existing February-April closures in two specific areas within LCMA 1 Massachusetts Restricted Area (Northern Mass Bay and Revised Western End). A third and larger area within LCMA 1 Massachusetts Restricted Area would remain closed during the three-month period.
- In exchange for having access to the now-closed areas, participating trap/pot fishermen in the inshore lobster trawl fishery would commit to use a breakable sleeve on their rope (resulting in a reduced breaking strength at or below 1,700-pounds) on all vertical lines fished year-round (and not just during the three-month period nor just within the exempted area). As well, there would be a 50% reduction in effort (off permit) during the exemption.
- Use of the modified gear year-round is intended to provide a conservation benefit though a precise calculation was not part of the proposal. The areas identified for exemption were chosen based on sightings of right whales. If there were to be a confirmed entanglement involving the modified gear, the exemption would be rescinded.
- Distinct markings would be required for both the modified line and buoys used by any trap/pot fishermen opting in to the voluntary program. (Marking of the buoy was incorporated in the proposal at the meeting in response to Team member comments regarding enforcement considerations.)
- The proposal is intended to provide expanded fishing opportunities to the inshore lobster trawl fishery within the restricted area. Given operational constraints including the infeasibility of small vessels transiting around Cape Cod to reach non-closed areas, J. Haviland said, the current closure has a severe economic impact on the fleet.

The proposal generated significant conversation among Team members both in plenary sessions and within interest-group caucuses. In addition to a number of clarifying questions, below is a summary of key discussion points.

- Many Team members, regardless of their perspectives on the merits of the exemption itself, commended the association for its hard work to craft a request that sought to incorporate creative gear modifications while providing greater economic security to fishermen.
- Conservationists and a number of researchers voiced concern that the proposal, while commendable and based on the best available science, still has too many uncertainties to adopt in an area and at a time where there is a reasonable likelihood of interaction with right whales. Their concerns centered, in particular, on the increased fishing effort within the now-closed areas, uncertainty regarding gear performance, feasibility of enforcement, and the lack of a demonstrable, quantified conservation benefit. At least one researcher strongly supported the proposal, suggesting it provided an important opportunity to work with willing fishermen on a promising gear modification and to gain solid information about a potential solution.
- Industry members and state representatives had mixed views. While some saw the exemption request as offering a viable pathway for fishermen struggling to make ends meet and several participants noted the importance of signaling to industry a willingness to work collaboratively, others suggested the proposal – while well intentioned – was problematic. Paramount was the concern voiced by some that the proposed gear modification would realistically set a problematic (though unintended) precedent that could be later applied more broadly and in areas (Maine, in particular) where it would not be fishable and likely pose a safety risk to fishermen. Several suggested more study was needed before moving forward with any such request.
- Several specific suggestions were put forward to address various concerns, including:
 - Requiring buoy markings to aid with enforcement;
 - Continuing conversations (post-TRT meeting) to identify possible changes to strengthen the exemption request and estimate the conservation benefit in greater detail;
 - Opening the closed areas to fishermen willing to grapple for gear (as opposed to using weaker vertical lines); and,
 - Forming a subgroup to consider when, where and how a weak-rope exemption might best be applied within the broader TRP geography (but not necessarily within the area identified in the exemption request).

Following the discussion, the facilitation team polled TRT members to gauge the level of support for the exemption request as drafted. Less than one-third of the Team present supported the exemption request as written; those voicing concerns cut across all sectors on the Team. Several Team members abstained from expressing a preference.

Based on the lack of broad-based support, NMFS encouraged the association, if interested, to work off-line with interested Team members to identify possible revisions to the exemption request that would make it more likely to garner broader support. NMFS noted the agency has several ways to consider a revised proposal, if submitted. Such a revised

request, could be considered via webinar and would not need to be deferred to the next in-person meeting. Team members were encouraged to contact J. Haviland if they are interested in providing input into a revised exemption proposal.

E. Reporting Requirements

Two presentations on Day Three centered providing updates and seeking feedback on two distinct but related efforts to improve reporting on fishing activity.

- ***ASFMC Reporting Requirements.*** Peter Burns with NOAA Fisheries presented on the Atlantic States Fisheries Management Commission's plans to update lobster reporting and biological data collection in state and federal waters to strengthen ongoing analysis and response to management needs, including ALWTRP data needs. Preliminary recommendations under consideration include: (1) short-term – maximize harvester reporting and define inshore and offshore fishery; (2) near-term – expand scope of harvester data components (e.g., requiring 100% active harvester, or statistically valid sample, for all state and federal lobster fishers; expanding data fields); and (3) longer-term – incorporate new technology to improve reporting, compliance monitoring and location of critical fishing areas (e.g., electronic swipe card system; fixed-gear vessel trip report for all federal permit holders). A draft may be available for comment as early as fall 2017; potential approval of final recommendations is anticipated in 2018.

In addition to posing a number of clarifying questions, individual Team members comments included the following

- Gather data at a finer spatial resolution to inform management actions (better to collect too much than too little as data can always be aggregated up).
 - Push for improved spatial data as part of the short-term recommendations.
 - Avoid redundant reporting requirements so as not to overburden fishermen (e.g., data on vertical lines can be extrapolated from existing vessel trip reports).
- ***IEc Reporting Survey.*** Bob Black with Industrial Economics, Inc. (IEc) presented on the firm's ongoing efforts to improve commercial fishing data available (activity and gear) to better support TRP development and implementation. IEC is currently working to develop an MMPA-based report that would serve as a long-term reporting vehicle for gillnet and offshore trap/pot fishermen and interim/temporary reporting pathway for lobster vessels (in advance of ASMFC reporting changes). In developing the survey, IEC has several goals. They are looking to achieve several goals concurrently: streamline the reporting method, identify a simple reporting method, gather comprehensive information on fishing activity location (while preserving confidentiality), and establish consistent data across states and fishing areas.

In additional to clarifying questions, Team members offered individual feedback on three specific topics identified by IEC: reporting areas and maps; survey administration; and ensuring clarity/reducing burden.

- The 30-minute grid squares offshore are too coarse to support effective management; consider finer-scale data.
- Current reporting requirements don't distinguish areas with the 0-3 miles.
- Near-shore area (within 12 areas) seems too large; consider finer-scale data.
- Maintain link (aggregating up) to rectify to statistical areas.
- Foster coordination/integration between the IEC reporting survey and the ASFMC's effort.

At least one Team member noted that outreach to industry will be needed before she can provide informed feedback on the reporting form and approach. B. Black asked Team members to provide additional feedback post-TRT meeting.

F. Large Whale Mortality Response Funding

Based on a request from B. McLellan, the Team considered and supported a recommendation calling on NMFS to provide new funding to support large whale mortality response. There currently exists approximately \$3,000 of funding remaining.

According to B. McLellan, the funding is needed to cover, among other things, costs associated with carcass towing and transport, necropsy and disposal, necropsy team travel and necessary equipment. This funding is needed, he said, to cover activities beyond levels already provided by local stranding organizations.

Below is the recommendation endorsed by the Team. (One Team member abstained; all others voiced support. K. Damon-Randall emphasized that the Agency does not yet have funding for the current fiscal year and noted that any such recommendation provided by the Team will be evaluated among other competing budget priorities.)

“The Atlantic Large Whale Take Reduction Team (ALWTRT) strongly supports the essential need for rapid and high-quality mortality investigations of large whale species, especially right whales, in support of recovery efforts. The ALWTRT requests that NMFS take immediate action to insure that adequate funding is available to the stranding response network for large whale necropsies.”

G. Public Comment

Several members of the public offered comments at various points over the three days. In addition to a number of clarifying questions, public comments focused on the following:

- Several fishermen spoke in favor of the South Shore Lobster Fishermen's Association's proposed exemption request. Speakers emphasized the opportunity the exemption proposal would provide to test 1,700-pound gear with willing fishermen, support collaborative efforts, and help fishermen work year-round. Following the Team's deliberations, fishermen voiced frustration and disappointment with the Team's lack of support for the proposal and with the lack of cross-caucus collaboration.

- Several fishermen voiced concerns regarding the prospects of ropeless fishing, 1,700-pound breaking strength line and/or grappling for gear as viable alternatives for many lobstermen due to strong currents, a variety of implementation challenges, and potential risk to fishermen from breaking line (lost gear, possible serious personal injury). Fishermen also noted that the specs they use in buying gear are based on rope diameter, not breaking strength.
- One researcher encouraged the Team to take the “long view” with regards to emerging options like ropeless fishing, and he encouraged collaborative efforts to explore approaches that may prove viable for industry and also help reduce or eliminate entanglements. He also recommended the Team focus its deliberations and recommendations on those actions (e.g., entanglements) that are within the Agency’s control as opposed to conditions it is unable to impact (e.g., food supply). Finally , he emphasized the imperative for action given the impact of sub-lethal impacts on calving and the mortality tied to increased entanglements.
- One researcher suggested the current SRG process is insufficient for vetting abundance data given what she sees as its insufficient public comment process, limited baseline data and heavy workload. She recommended using an existing independent panel such as the Center for Independent Experts to vet the Science Center’s latest work. She also recommended the Agency consider using Management Strategy Evaluation to guide Plan revisions.

V. NEXT STEPS

Based on the Team’s deliberations, the following next steps were identified:

- ***Caucus Reports.*** Both industry/state and researcher/conservationist caucuses are to refine and provide their lists of recommended actions to the Agency by Friday, May 5. Additionally, representatives from the two caucuses are to meet separately to develop, as possible, an integrated list of prioritized actions supported by both caucuses. This integrated list should be shared with NMFS.
- ***South Shore Lobster Fishermen’s Association Exemption Request.*** J. Haviland with the South Shore Lobster Fishermen’s Association is to consider the merits of revising the proposed exemption request for future consideration by the Agency and Team. Team members interested in providing feedback to the Association are to work with J. Haviland directly.
- ***Feedback to IEC.*** All Team members are to provide additional feedback over the next few weeks to IEC on its proposed reporting survey. NMFS is moving forward with the development of reporting options for gear characterization information and will share these options with the Team at its next meeting

- **Updated Research Results.** A. Knowlton is to provide updated results on her ongoing testing of weaker rope. E. Summers will provide the results of the work she expects to conduct this summer on baseline results of her load cell study.
- **Key Outcomes Memorandum.** CONCUR is to distribute for Team comment and review a Key Outcomes Memorandum summarizing primary discussion points, consensus actions and next steps. Team members are asked to undertake a timely “red-flag” review, highlighting errors or omissions.
- **Update Research Matrix.** NMFS is to send to Team members the current research matrix for updating.

Future meetings. No future meetings or webinars are scheduled at this point though there is the possibility of near-term webinars.

Questions or comments regarding this meeting summary should be directed to S. McCreary, B. Brooks or K. Swails. S. McCreary and B. Brooks can be reached at 510-649-8008 and 212-678-0078, respectively; K. Swails at 978-282-8481.

Addendum 1:

State Agencies and Industry Research, Data, and Data Sharing Requests

1. There is an urgent need to get Canada involved due to the transboundary aspect of the range of large whales.
 - More involvement with the ALWTRT by Canada researchers, government agencies, industry, etc.
 - Need parity in whale protection measures between US and CN fishing industries (e.g., gear marking, gear configuration, etc.).
 - Design surveys to be compatible between countries.
 - Coordinate science, research, and mitigation measures (e.g., gear marking, configuration).
 - Participate in Large Whale Stock Assessments especially those under ESA designation.

2. Have an independent panel of experts conduct a rigorous external peer review of the North Atlantic Right Whale (NARW) stock assessment (and other whales that are ESA listed) and management program and strategies. This should include a peer review of Large Whale scarring and entanglement rates and assessment of body health as relating to entanglements.
 - Have an independent panel of experts/peer reviewers that are not associated with relevant published research, regional TRT's, or the Large Whale stock assessments.
 - Frame the Terms of References (TOR's) for a rigorous stock assessment.
 - Provide enough time and resources for a thorough peer review by the panel.
 - Peer review process must be transparent and available to the public.

3. Conduct population projections and risk assessment for NARW to assess the likelihood of management success under several different scenarios and to account for climate change and broad scale ecosystem changes such as food availability and scenarios of distribution shift. Analysis should consider several scenarios:
 1. Recent calving rates, current rates of anthropogenic mortality
 2. Recent calving rates, anthropogenic mortality = 0
 3. Recent calving rates, U.S. fishing deaths = 0, Ship strike mortality = current rate, Canadian fishing deaths = current rates
 4. Median calving rates, current rates of anthropogenic mortality
 5. Median calving rates, anthropogenic mortality = 0

6. Median calving rates, U.S. fishing deaths = 0, Ship strike mortality = current rate, Canadian fishing deaths = current rates

Discussion: It is well documented that the western North Atlantic is among the fastest warming environs in the world. This has resulted in broad scale ecosystem changes that have had substantial effects on the productivity and distribution of many marine fish and invertebrate fisheries. There have also been declines in the primary productivity of the Gulf of Maine that may affect the distribution and abundance of NARW's primary prey item, Calanus. The impact of a rapidly changing ecosystem on the productivity of and likelihood of recovery of the NARW needs to be considered. Therefore population projections for NARW to assess the likelihood of management success under several different scenarios needs to be analyzed.

4. Provide for opportunities for competitive request for proposals (list of priorities, etc.) for research.
 - Have the TRT develop a list of priorities to focus available funding (e.g., climate change impacts, stress hormones, etc.).
 - Encourage collaborative approaches to research.

5. There is an urgent need for a comprehensive assessment/summary of all gear characteristics (line diameter, line type, etc.) involved in entanglements and inclusion of industry in reviewing final determinations.
 - Develop a Large Whale Entanglement Database.
 - Develop an interactive accessible (interactive) database that catalogs gear characteristics recovered from NARW (and other whale) entanglements.
 - Share with the ALWTRT the data elements of the database.
 - Improve the NMFS's summarization of fishing gear removed from entanglement cases of NARW (and other ESA whale species).
 - If the fishery cannot be identified from entanglement gear, determine which fisheries the gear is not from.
 - Establish an annual industry review of gear found from entanglements.
 - Develop a workgroup of Industry and Entanglement network staff to help develop a diagnostic approach to classifying gear removed during disentanglement events.
 - Review line size found with entanglements.
 - Assess and inform the ALTWRT with emerging fisheries that have gear that will co-occur with whale migrations.

Discussion: While NOAA Fisheries and the disentanglement network conducts a summarization of fishing gear removed from entanglement cases of NARW there is much information that can be garnered from commonalities observed among fishing gear. Optimally, gear would be identified down to the exact fishery. However, understanding that this is extremely difficult to do in most cases, every attempt should

be made to extract as much information as possible from the entangled gear. This information may not be able to identify what fishery the gear is from, however it likely would be capable of determining which fisheries the gear is not from. This would help to focus conservation efforts on the fisheries responsible for entanglements. Having the industry more involved in determining the type of gear found from entanglements may help NOAA Fisheries in further identifying gear. This can be achieved by organizing a workgroup of Industry and Disentanglement Network members to develop a diagnostic approach to classifying gear removed during disentanglement events. Essentially, Have the industry more involved in determining type of gear found from entanglements.

6. Assess the current gear marking strategies to determine associated rules efficacy.
7. Assure science and the statistical modeling is thoroughly peer reviewed and then address the concerns/issues of the review.
 - The Co-occurrence model failed peer review. Have the concerns/issues been resolved or modified?
 - The spatial resolution of the data on effort doesn't show the co-occurrence areas at a fine enough detail.
 - Have an independent set of reviewers look at the modeling and make recommendations.
8. Research climate change effects on whales and predator/prey (*Calanus finmarchicus*) interactions, aggregations, prey supply, and needed conditioning.
 - Specifically, determine whether there has been a shift in abundance, density (aggregation into layers), and quality (oil sac/caloric content) of the *Calanus* resources prior to and after 2010 throughout the right whale's feeding range (Gulf of Maine and the Gulf of St. Lawrence).
 - Institute forecasting modeling throughout the same region to try and determine where and when NARW's may be distributed given the changes in their distribution and/or residency times in feeding habitats.
9. Completely assess the operational feasibility of 1,700 pound breaking strength fishing line and its effectiveness in reducing serious injury or mortality to whales with vertical line fishing gear. Additionally, assess the current line strength used in vertical line fisheries. Questions need to be addressed before line strength is considered as a conservation benefit or mitigation measure, such as:
 - What diameters of rope are currently being used for vertical lines spatially?
 - What is the ratio of sinking to floating line on the vertical line?
 - Are knots and/or splices used to construct the vertical line affecting rope strength?
 - What is the functional breaking strength of rope being fished in the environment currently?

- What is the spectrum of hauling load experienced by the vertical line, including by boat size, instances of rough seas, hang-downs on rocks and hard bottom, being set over, etc.?

Discussion: There is not enough known about the operational feasibility of 1,700 pound breaking strength line (or whale release rope) to make suggestions or recommendations on its use, be able to comment on a proposal to use this new technology, or offer areas where it might be used successfully. A baseline assessment of current rope strength, relating to a suite of haul loads, being utilized by vertical line fisheries is needed before any rope strength rule recommendations occur under any auspices of providing conservation benefit to whales versus entanglement concerns.

The State of Maine may be conducting a small study in the summer of 2017 to assess the spectrum of “hauling loads” experienced currently by Maine lobster industry. The elements collected and field research may entail at a minimum:

- *Installing a load cell on a variety of vessels for a specific period of time (e.g., one or two weeks) during normal fishing practices*
- *Record a variety of related fishing factors; such as distance from shore, bottom type, and lobster management zone*

Additional NOAA financial support for this work can advance the work more quickly and provide a larger spatial analysis to the study as Maine’s funding is very limited and will be focused on solely a small portion of Maine’s fishing industry. By understanding the baseline of fishing line strength currently being used throughout the Atlantic coast and varying fisheries the TRT could have a well-informed discussion on fishing line strength concerning the effectiveness of preventing serious injury or mortality to whales and the conservation benefits the fishing industry can contribute to this concern.

ADDENDUM 2

Conservationist/Scientist Caucus Report

REQUESTS TO NMFS REGARDING TRT PROCESS

Rationale: given the lack of meaningful progress in addressing the ongoing entanglement problem at the April 2017 TRT meeting, we offer the following suggestions for the TRT process to better enable team members to evaluate the latest data and findings and to discuss options for entanglement reduction more constructively.

Future TRT Meetings

- We request that NMFS convene ALWTRT meetings more frequently. Recognizing the financial and logistical constraints that make convening in-person meetings challenging, we believe quarterly webinar meetings are necessary to enable team members to review and discuss information on a regular and ongoing basis.
- Recognizing the value of face-to-face meetings, we suggest that NMFS schedule the next in-person TRT meeting for four to six months from now.
- To facilitate discussions, we request that team members be provided with reports, presentations and other relevant information prior to the meetings. Receiving this information at least a week ahead of the meeting would enable more informed questions and discussions.

Entanglement and Recovered Gear Reports for Future TRT Meetings

- We ask that NMFS provide quarterly reports to the TRT on entanglements and recovered gear from those entanglements. Specifically, we suggest that these reports:
 - Provide cumulative data over the course of the year (1st quarter report = 1st quarter data, 2nd quarter report = 1st and 2nd quarter data, etc.).
 - Break out entanglement reports by species.
 - Include any identified gear markings and link those gear markings to specific areas where possible.
- We also ask that NMFS expedite the production of these reports to the TRT in all cases where there is no OLE investigation. In the event of an OLE investigation of an entanglement case, the entanglement information generated for the case should be made available to the Team as soon as possible after the investigation is complete.
- We suggest that NMFS make available to the Team the right whale entanglement case studies compiled by NEAq available, and that NMFS facilitate including gear markings in these case studies where available.
- We request that NMFS convene a working group (including NMFS staff, fishermen, scientists, and other persons with fishing gear, disentanglement, and other relevant experience) to examine retrieved gear and compile ancillary information to help

identify retrieved gear and correlate it with injury/mortality information (e.g., information obtained via necropsy).

- We also suggest that NMFS ensure that high-quality forensic photographs are taken of any entanglement, including photo documentation of any gear and gear marks on the animal.
- We request that NMFS facilitate this data being presented by scientists, team members, or other members of the external group at Team meetings (including webinars) as appropriate.

Specific Report Requests

- We request that NMFS provide the Team with two specific reports:
 - A report on the statutory and regulatory authorities that govern ropeless fishing in federal waters and any potential legal impediments to ropeless fishing in trap/pot or gillnet fisheries. We understand that the golden crab trap/pot fishery in southeast Florida is an example of a ropeless fishery in federal waters that can inform such a report.
 - A report about subtidal aquaculture facilities and other emerging fisheries in Atlantic waters that may add horizontal or vertical lines to the water column.

GEAR MARKING RECOMMENDATIONS

Rationale: NMFS introduced gear marking requirements at the suggestion of the TRT to gather better data regarding the location, timing and fisheries involved in entanglement incidents. Based on what was presented at the April 2017 ALWTRT meeting, it appears that the current gear marking regulations are failing to fully meet this goal. The markings on gear taken off entangled whales are proving insufficient to recover the critical data for which they were designed.

The fishing industry has made great strides in gear marking, and there has been some improvement in the proportion of recovered gear which is identifiable. Despite these gains, however, the majority of recovered gear remains unidentified and we lose valuable entanglement data. Let's not waste the efforts of those who carefully mark their gear and those who recover it from entangled whales. To address this situation, we submit the following recommendations to better align gear marking practices with our shared goal of understanding the locations, times, and fisheries involved in entanglement incidents.

- We recommend that a TRT working group with NMFS, industry, science, and conservation representatives be convened to revisit previous gear marking recommendations and to develop specific recommendations for revising current gear marking requirements and methods for all fixed gear fisheries, taking into consideration the following:
- Efforts to revise and expand U.S. gear marking requirements need to be developed in cooperation with Canada to the maximum extent possible. NMFS should consider setting aside markings/colors that can be exclusive for Canadian fisheries.

- Gear marks need to be sufficiently distinctive, frequent, and durable enough to be detectable when gear is taken off an entangled whale.
- Gear marks need to ensure more geographic specificity within U.S. waters, especially those off New England.
- The length of ropes taken off animals should be used as a guide to what marking intervals should be (i.e., every X feet) to ensure that recovered pieces have a high likelihood of being identifiably marked. We suggest a joint research effort led by scientists and fishermen.
- To evaluate the effectiveness of the sinking groundline requirement, distinct and identifiable marks are needed on groundlines as well as buoy lines.
- Unidentifiable buoys/floats have been taken off entangled whales. Although lobster pot buoys are generally well marked, there need to be more permanent and durable marking methods across all trap/pot fisheries to ensure that buoys/floats continue to be identifiable over longer periods of time.
 - The concept of requiring RFID or PIT tags, particularly for buoys, should be revisited.
- It is unclear whether current enforcement levels are adequate to ensure a high level of compliance with gear marking requirements. We request that NMFS provide a report to the TRT on enforcement of and compliance with gear marking requirements.

MITIGATION

We believe it is worthwhile exploring in more detail the potential of gear alternatives such as ropeless fishing and/or 1700 pound breaking strength lines to reduce or avoid entanglements. Post-April 2017 TRT meeting, the scientist/conservationist caucus has continued to discuss how best to explore the potential of gear alternatives but we do not have further recommendations to present at this time.